

a first partial beam and a second partial beam;

a first device for one of modulating a phase of the first partial beam with respect to a phase of the second partial beam, and for shifting a frequency of the first partial beam with respect to a frequency of the second partial beam by a heterodyne frequency;

a time delay element arranged in a beam path of one of the first partial beam and the second partial beam, for producing a difference of optical path lengths of the first and second partial beams, the difference being greater than a coherence length of the beam emitted by the at least one spatially coherent beam gun unit, the first partial beam and the second partial beam being superimposed on one another to form a first superimposed beam;

(1)  
cont a measuring probe for dividing the first superimposed beam into a reference beam and a measuring beam, the measuring probe including a reference arm for guiding and reflecting the reference beam therein, and a measuring arm for guiding and reflecting the measuring beam onto the rough surface, wherein the measuring probe compensates for the difference of optical path lengths so that the measuring beam in the measuring arm and the reference beam in the reference arm are able to interfere with one another;

a superimposing unit for superimposing the reflected measuring beam on the reflected reference beam;

a beam splitting and receiving unit for splitting the superimposed beam into at least two beams having different wavelengths and for converting the at least two beams into electrical signals;

an analyzer for determining the one of the shape and the distance of the rough surface as a function of a phase difference of the electrical signals; and

a remote unit separate from the measuring probe, wherein the at least one spatially coherent beam gun unit, the first beam splitter, and the first device are arranged in the remote unit.

19. (Twice Amended) The measuring device according to claim 11, wherein:

the measuring probe has a beam splitter, the measuring probe being one of a Michelson interferometer and a Mirau interferometer; and

an optical path difference provided by the measuring arm and the reference arm compensates for the difference in optical path lengths produced by the time delay element.